

Remarks

Reconsideration of the above-identified application is respectfully requested.

In the Office Action mailed February 18, 2005, the Examiner finally rejected claims 1-20 under 35 U.S.C. §102(e) as anticipated by U.S. Patent Application Publication No. US 2003/0236945 A1 ("the '945 publication"). Pursuant to 37 C.F.R. §1.116, the Applicants respectfully request the cancellation without prejudice of claims 1-20, and the entry of new claims 21-40. For the reasons set forth in detail below, the Applicants respectfully traverse the Examiner's rejection of claims 1-20 to the extent that rejection now relates to new claims 21-40.

Rejection of Claims 1-20 Under 35 U.S.C. §102(e)

As noted above, in the February 18, 2005 Office Action, the Examiner finally rejected claims 1-20 as anticipated by the '945 publication. The Applicants believe, however, that those claims are not anticipated by that reference, and respectfully traverse that rejection to the extent it now relates to new claims 21-40.

Independent claims 21 and 26 are directed to a system and method for managing a plurality of virtual storage volumes available to a user for use in storage and retrieval of user data. As recited in claim 21, the system comprises a pool linked to at least one of the plurality of virtual storage volumes, and a controller for automatically allocating a storage device to the pool. As recited in claim 26, the method comprises automatically allocating a storage device to a pool and linking at least one of the plurality of virtual storage volumes to the pool.

Independent claims 31 and 36 are directed to a virtual volume management system and method. As recited in claim 31, the system comprises a plurality of virtual storage volumes available to a user for use in storage and retrieval of user data, a storage pool linked to at least one of the plurality of virtual storage volumes, and a controller for automatically allocating a storage device to the pool. As recited in claim 36, the method comprises providing

a plurality of virtual storage volumes available to a user for use in storage and retrieval of user data, and automatically allocating a storage device to a storage pool and linking at least one of the plurality of virtual storage volumes to the pool.

In such a fashion, as an example, a user wishing to employ a storage device in a storage area network need not identify which servers will use the device and then install the appropriate software driver on all such servers. Instead, the claimed invention automatically allocates the device to a pool, accounting for and handling any differences between storage devices so that such differences are not apparent to a user. As a result, a user need not be involved in allocating a storage device to a pool. A single pool may also comprise different types of storage devices including, but not limited to, disks from different manufacturers, different RAID controllers, or physical and virtual storage devices. (*See, e.g.*, Specification; p. 7, l. 3 - p. 9, l. 13.)

The '945 publication is directed to storage virtualization in a storage area network. Virtual storage volumes are presented and appear to a host as being connected to a storage area. The virtual volumes represent available physical storage devices, which are listed in storage pools. In operation, the host sends a storage request to a virtual address in a virtual volume, which address is translated into physical storage locations where data is saved. (*See, e.g.*, '945 Publication; ¶¶ 57, 102.)

The '945 publication also discusses management of the storage pools and virtual volumes in the storage area network. In that regard, the '945 publication discloses that storage pools and virtual volumes may be managed manually, indicating that a system administrator may create and/or delete both storage pools and virtual volumes. (*See, e.g.*, '945 Publication; ¶¶ 105-107, 110-112.)

Significantly, however, with respect to automatic management, the '945 publication fails to teach or suggest that storage pools may be managed automatically. Instead,

the '945 publication discloses only that virtual volumes may be managed automatically, indicating that application program interfaces may also create and/or delete virtual volumes:

[0108] 2. A first Application Program Interface (API1) enabling a user application computer program to manage Virtual Volumes without "human intervention."

[0109] 3. A second Application Program Interface (API2) permitting a "storage application" computer programs to manage Virtual Volumes without human intervention.

* * *

[0113] By another method of management, the SVM 3 operates an API1 to permit to any user application program, running in any one of the hosts 1 to handle Virtual Volume management. The API1 consists of a set of functions running in the NT of the SVM 3, and may be accessed by any application program, via the user network 6.

[0114] For every management task available manually to the System Manager via the GUI (Graphical Utility Interface), a parallel API1 function may be called remotely. These parallel functions include, among others, commands such as "Create Virtual Volumes", "Delete Virtual Volumes", "List the number of Virtual Volumes", and so on. Many types of application programs may take advantage of the API1 facility, for example, a backup application program may send a request to reassign the permission attributed to the Virtual Volume(s) to a backup server and then, commands operation of the program backup run.

[0115] The management of Virtual Volumes may thus be driven automatically by a first API1 configured for use with user application programs, if the necessary list of parameters is supplied by the user.

[0116] Storage Applications programs are applications recognized as being SAN-centric as opposed to host-centric operations. An API2 runs the virtualization SVM Driver 60 and is an integral part of the SVM 3 system. Similar to the user application programs, the storage application programs may also request Virtual Volume management function from the SVM 3.

In this case, those request flow through the storage network (Fiber Channel or other) instead of via the users network. The reason is that the storage application programs are part of the SVM 3 and the internal protocol between the SVM 3 and the SVM Driver contains the API2 requests.

[0117] The management of Virtual Volumes may thus be driven automatically by a second API2 configured for use with storage application programs, if, as before, the list of necessary parameters is supplied by the user.

(‘945 Publication; ¶¶ 108-109, 113-117 (emphasis added).)

Thus, contrary to the Examiner’s contention, all of the functions available to the system administrator are not also performed automatically by the application program interfaces. As is apparent from its context, the statement in the ‘945 publication that a parallel application program interface function exists for every manually available management task is clearly a reference only to the management of virtual volumes. While the ‘945 publication discloses that virtual volume management functions may be performed automatically by the application program interfaces, it does not teach or suggest that storage pool management functions may be performed automatically by the application program interfaces. (*See, e.g.*, ‘945 Publication; ¶¶ 105-107, 110-112.)

Those sections of the ‘945 publication cited by the Examiner in the February 18, 2005 Office Action (*see, e.g.*, ‘945 Publication; ¶¶ 102, 122) are no different from those section of the ‘945 publication cited by the Applicants above. The ‘945 publication discloses the automatic creation, deletion or expansion of a virtual volume from an existing or defined storage pool. That is different from and unrelated to the automatic allocation of a storage device to a pool, which the ‘945 publication fails to teach or suggest. Instead, as noted above, the ‘945 publication discloses only manual administration or management of a storage pool.

The ‘945 publication therefore fails to teach or suggest automatically allocating a storage device to a pool, as recited in independent claims 21, 26, 31 and 36. Indeed, in that regard, the ‘945 publication suffers from the same problems associated with the prior art

discussed in the present application, which the Applicants' claimed invention overcomes to provide the advantages described. (*See, e.g.*, Specification, p. 1, l. 11 - p. 2, l. 24; p. 5, l. 11 - p. 11, l. 8.)

As a result, for at least the foregoing reasons, the Applicants believe that independent claims 21, 26, 31 and 36 are not anticipated by the '945 publication. Claims 22-25, 27-30, 32-35 and 37-40 depend either directly or indirectly from independent claims 21, 26, 31 and 36, respectively, and include all the limitations thereof. As a result, and for at least the reasons set forth above concerning independent claims 21, 26, 31 and 36, the Applicants believe that claims 22-25, 27-30, 32-35 and 37-40 also are not anticipated by the '945 publication.

Moreover, it should be noted that the '945 patent also fails to teach or suggest, as recited in claims 24, 25, 29, 30, 34, 35, 39 and 40, a system or method wherein the plurality of storage devices, at least two of which are automatically allocated to a pool, comprises a virtual device such as a virtual volume or a virtual disk. Instead, as previously described, the '945 publication discloses only that storage pools are lists of physical storage devices available in the system. Indeed, the '945 publication describes virtual volumes only as presented and appearing to a host, not as storage devices that may themselves be part of a pool. (*See, e.g.*, '945 Publication; ¶¶ 57, 102.)

In that regard, contrary to the Examiner's contention in the February 18, 2005 Office Action, the virtual volume and virtual disk features noted above were explicitly recited in claims 4, 5, 9, 10, 14, 15, 19 and 20. Those same features are also explicitly recited in new claims 24, 25, 29, 30, 34, 35, 39 and 40.


Conclusion

For at least the foregoing reasons, the Applicants believe that claims 21-40 meet both the formal and substantive requirements for patentability, and that the application is in condition for allowance. Accordingly, such action by the Examiner is respectfully requested.

If a telephone conference would expedite allowance or resolve any additional questions, such a call is invited at the Examiner's convenience.

Respectfully submitted,

Ravi K. Kavuri

By 
Jeffrey M. Szuma
Reg. No. 35,700
Attorney/Agent for Applicant

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BROOKS KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351